

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
17 July 2003 (17.07.2003)

PCT

(10) International Publication Number  
WO 03/057000 A3

(51) International Patent Classification<sup>7</sup>: A61B 8/00,  
A61M 16/00

(21) International Application Number: PCT/IL03/00015

(22) International Filing Date: 5 January 2003 (05.01.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/344,803 7 January 2002 (07.01.2002) US  
60/361,091 1 March 2002 (01.03.2002) US

(71) Applicant (for all designated States except US): MED-  
SON LTD. [IL/IL]; 4 Pekeris Street, 76702 Rehovot (IL).

(72) Inventors; and

(75) Inventors/Applicants (for US only): SELA, Natan  
[IL/IL]; 4 Pekeris St., 76702 Rehovot (IL). BUKSHPAN,

Shmuel [IL/IL]; 4 Pekeris St., 76702 Rehovot (IL).  
COHEN, Lior [IL/IL]; 4 Pekeris St., 76702 Rehovot  
(IL). KARDOSH, Michael [IL/IL]; 4 Pekeris St., 76702  
Rehovot (IL).

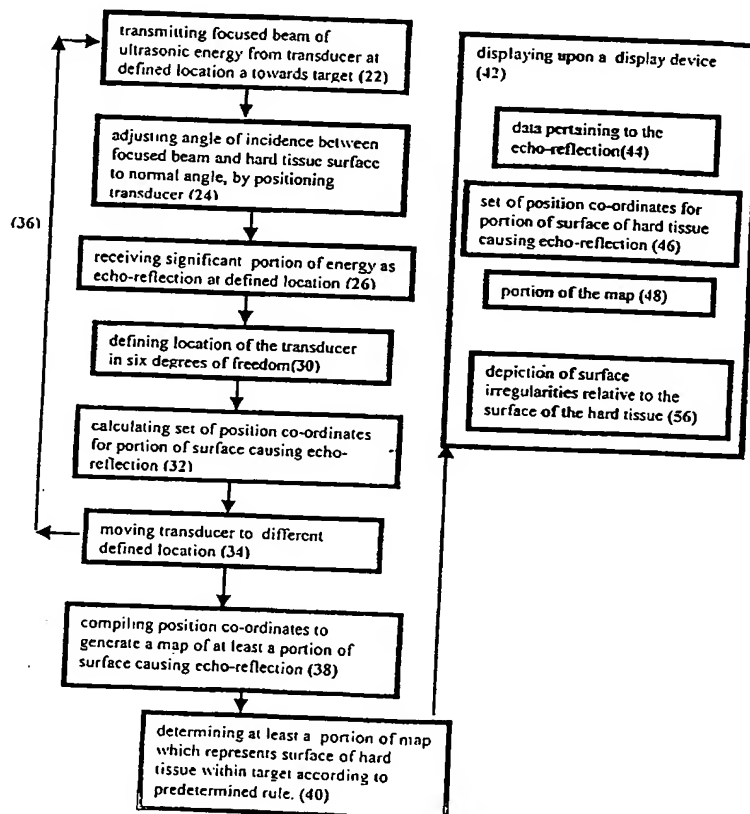
(74) Agent: FRIEDMAN, Mark, M.; Beit Samuellof, 7 Hao-  
manim St., 67897 Tel Aviv (IL).

(81) Designated States (national): AE, AG, AL, AM, AT, AU,  
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU,  
CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH,  
GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC,  
LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW,  
MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE,  
SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ,  
VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM,  
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),  
Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM),  
European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE,  
ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, SE, SI,

[Continued on next page]

(54) Title: SYSTEMS AND METHODS OF 3 DIMENSIONAL ULTRASONIC IMAGING OF HARD TISSUE



(57) Abstract: A system (60) and method (20) of creating an ultrasonic image (48) of a hard tissue (70) within a target (68). The method (20) includes comprising transmitting (22) from a defined location (64) a beam energy (66) towards the target (68), adjusting (24) the angle of incidence between the beam (66) the hard tissue (70) to a normal angle, receiving (26) an echo-reflection at said defined location (64), calculating (32) a set of position co-ordinates (46) the surface causing the echo-reflection repeating (36) the sequence from additional locations (64), compiling (38) position co-ordinates (46) to generate a map (48) of the surface (69) causing the echo-reflection (65), and determining (40) a map (48) which represents a surface (69) of the hard tissue (70) by a predetermined rule. An additional method (90) employing reception of the echo reflection (60) at additional defined locations (64) is disclosed, as are systems (60) for performance of the claimed methods (20) (90).